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(71) Applicant (for all designated States except US): **SEVEN S.P.A.** [IT/IT]; Viale Italia, 73, I-10040 Leini' (IT).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **DI STASIO, Aldo** [IT/IT]; Seven S.p.A., Viale Italia, 73, I-10040 Leini' (IT).

(74) Agent: **CARAMELLI, Mariella**; Via Servais, 27, I-10146 Torino (IT).

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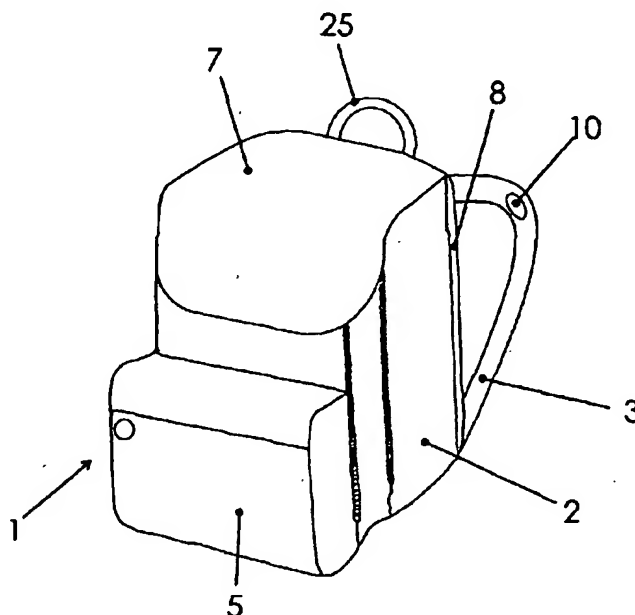
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(54) Title: **KNAPSACK**



(57) Abstract: A knapsack (1) is disclosed, for example of the school type, for transporting objects, the knapsack (1) being equipped with supporting shoulder straps (3) and equipped with means (10) for supporting and cushioning the weight of the knapsack (1), preferably placed on the shoulder straps (3) and/or on the backboard (8) of the knapsack (1), wherein these means (10) for supporting and cushioning are adapted to be filled with a fluid, for example a gas, a liquid or a gel.



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**KNAPSACK**

The present invention refers to a knapsack for transporting various types of materials, particularly books and school materials or the like, in which the knapsack is transported by the user resting on his shoulders and on his back and/or his breast (in this case, it is a so-called "fannypack" knapsack).

Knapsacks for school and entertainment nowadays are more and more widely successful due to the comfort and easiness of use they provide for their users for transporting various types of objects, leaving the hands free.

Since such knapsacks are used, in the vast majority of cases, to transport books and school materials (in addition, obviously, to other types of materials), problems occur due to their weight, that can sometimes be excessive with respect to the person wearing them, above all when such person is a child or a young man, with respect to whom the contents (and therefore the weight) of the knapsack

is a high percentage and that often results both harmful and uncomfortable to transport.

There are no arrangements in the art that allow optimising the transport of knapsacks, enabling to reduce the effort that the weight of a full knapsack implies for the shoulders and the back of a user.

Neither are present in the art arrangements that allow cushioning the impacts given by a heavy knapsack to the shoulders, the back or the breast of the wearer.

Object of the present invention is solving the above prior-art problems by providing an improved knapsack that allows helping shoulders, back and breast of a user to support the weight of the knapsack itself.

A further object of the present invention is providing a knapsack equipped with means whose function is also cushioning the impacts to which shoulders, back and breast of a user are subjected when the user moves and transports a heavy knapsack.

A further object of the present invention is providing a knapsack in which the supporting and cushioning arrangement is optimally adapted to the

height and type of shoulders, back or breast of a user, efficiently shaping itself to them and allowing users that are "dimensionally" very different to use the knapsack.

The above and other objects and advantages of the invention, as will appear from the following description, are obtained by a knapsack as claimed in Claim 1. Preferred embodiments and non-trivial variations of the present invention are claimed in the dependent Claims.

The present invention will be better described by some preferred embodiments thereof, given as a non-limiting example, with reference to the enclosed drawings, in which:

- Figure 1 is a perspective view of a preferred embodiment of a knapsack to which the present invention is applied;
- Figure 2 is a front view of a shoulder strap of the knapsack in Fig. 1;
- Figure 3 is a side view of the shoulder strap in Fig. 2;
- Figure 4 is a front view of a type of pre-formed backboard of the knapsack in Fig. 1 to which the present invention can be applied;

- Figure 5 is a front view of another embodiment of a shoulder strap for knapsacks to which the present invention can be applied;
- Figure 6 is a front view of a further embodiment of a shoulder strap for knapsacks to which the present invention can be applied;
- Figure 7 is a front view of a further embodiment of a shoulder strap for knapsacks to which the present invention can be applied; and
- Figure 8 is a side view of the shoulder strap in Fig. 7.

With reference to the Figures, some currently preferred embodiments of the present invention are shown. The embodiments, in addition to the type of knapsack (for school use) shown, are only a non-limiting example of the scope of the present invention. In fact, the invention can be applied to any type of knapsack that is adapted to be transported by the shoulders and the back and/or the breast of a user.

With particular reference to the Figures, a preferred embodiment of the knapsack 1 of the present invention is shown. The knapsack 1 is of the known type suitable for transporting objects of any type, and in a widespread application

thereof, suitable for transporting school materials (books, exercise books, pencil cases, etc.).

The knapsack 1 of the invention, in the type being shown, is adapted to be transported on the shoulders and on the back of a user and, for this purpose, it is equipped with at least one (and preferably two) shoulder strap 3, whose length can be adjusted in a known way to be adapted to the user's height and whose shape can be modified at will according to the products. The shoulder straps 3 could obviously be of any number and of a different configuration and arrangement with respect to the shown ones, but obviously the invention can be applied to any type of shoulder strap 3 that is adapted to allow loading and transporting the knapsack 1 as worn by a user.

The knapsack 1 further includes a main compartment 2 in which the material with higher weight and sizes is usually placed, and a set of smaller compartments, only one of which is shown by the reference number 5, such smaller compartments being adapted for example to contain pencil cases, snacks or materials with lower sizes and weight. The knapsack 1 is composed of a cover 7 adapted to close the knapsack 1 through common closing means

(for example of the type with snap-lock arms, or with a zipper, not shown). The knapsack 1 is equipped with a backboard 8 that abuts against the user's back, and that is generally formed of a stronger material than the one for the remaining sides of the knapsack: such backboard 8 is usually realised with a padding 9 to make the contact with the user's back more comfortable, and with ribs 9' that make its resiliency better, substantially shaping the backboard to the wearer's back. The shoulder straps 3 are commonly secured to the knapsack 1 on the side that comprises the backboard 8, since both shoulder straps 3 and backboard 8 cooperate with the user's body in order to allow him to transport the knapsack 1.

In an inventive way, the knapsack 1 of the invention is equipped with means 10 for supporting and cushioning the weight of the knapsack 1 itself: such means 10 for supporting and cushioning for this purpose are adapted to be filled with a fluid, that can be a gas, for example air, or a liquid (a transparent or coloured liquid, for example vaseline and foodstuff dye), or further a foamed material or a polymeric gel.

In particular, the means 10 for supporting and

cushioning are placed on the supporting shoulder straps 3 of the knapsack 1 on the side of the shoulder straps 3 in contact with the user's shoulders, so that, once being filled with air or another fluid, they can be easily shaped to the user's shoulders, according to the type of knapsack 1 and of the size of the shoulders themselves.

According to a preferred embodiment, the means 10 for supporting and cushioning are composed, for each supporting shoulder strap 3, of at least one tubular band 12 adapted to be filled with the fluid and placed through known means (glueing, sewing, HF, etc.) on the internal part of the shoulder strap 3.

If one so desires, the tubular band 12 for every shoulder strap 3 can be equipped with at least two mutually-communicating fluid chambers 14, 16, that can be of an elongated shape and mutually parallel, as can be better seen in Figs 7 and 8, or of a quadrangular shape and, in a number that is greater than two, mutually adjacent on their respective sides, as can be better seen in Figs 2 and 3, or 5 and 6. In particular, Figures 5 and 6 show a preformed version of the shoulder straps 3 in which the means 10 in a version extend for the



whole length of the preformed shoulder strap 3, and in another version extend only in the upper part of the preformed shoulder strap 3.

In addition to being placed on the shoulder straps 3, the means 10 for supporting and cushioning can be placed on the backboard 8 of the knapsack 1, on the side of the backboard 8 in contact with the user's back. In this case, the means 10 for supporting and cushioning can be composed of at least two side elements 19, 19' in a single body (not shown) or with quadrangular chambers 20 shaped as adjacent diamonds (Fig. 4) that extend in the longitudinal direction with respect to the user's back.

Moreover, the knapsack 1 of the invention can be equipped with further means 10 for supporting and cushioning composed of at least one central element 21 in a single body (not shown) or of quadrangular chambers 22 shaped as adjacent diamonds (Fig. 4), that extends in a transverse direction with respect to the user's back.

It is also possible, in order to further improve the transport comfort, that the knapsack 1 of the invention is equipped with means for supporting and cushioning (not shown, because

similar to the above-described ones) placed also on the manual handle 25 for transporting the knapsack 1, on the side of the handle 25 in contact with the user's hand palm.

With the above-mentioned arrangements, it is obviously possible to adopt any combination in which the means 10 for supporting and cushioning are placed on the supporting shoulder straps 3, on the backboard 8 and on the handle 25 of the knapsack, together or as an alternative.

Moreover, in order to make adjustable the inflation status of the means 10 for supporting and cushioning, they can be equipped with inflating means (not shown, and commonly of the type with pumping push-button, small pump, etc.) adapted to perform the adjustable inflation of the means 10 for supporting and cushioning.

As a completion for the above description, it is still more evident that the present invention is subjected to very many embodiments and variations and that therefore what is shown here is to be considered as a purely non-limiting example. For example, the fluid used for the supporting and cushioning functions could be of any type that is adapted to best perform the functions for which it

is foreseen, and the means 10 for supporting and cushioning could be composed of a plurality of mutually-separated, or mutually-communicating, chambers (as occurs, for example, in the sea mattresses or in other similar cases).

**CLAIMS**

1. Knapsack (1) for transporting objects equipped with at least one, and preferably two, supporting shoulder straps (3), characterised in that it is equipped with means (10) for supporting and cushioning a weight of the knapsack (1), said means (10) for supporting and cushioning being adapted to be filled with a fluid.
2. Knapsack (1) according to Claim 1, characterised in that said fluid is a gas, for example air.
3. Knapsack (1) according to Claim 1, characterised in that said fluid is a transparent or coloured liquid.
4. Knapsack (1) according to Claim 1, characterised in that said fluid is a polymeric gel.
5. Knapsack (1) according to Claim 1, characterised in that said means (10) for supporting and cushioning are placed on the supporting shoulder straps (3) of the knapsack (1) on a side of the shoulder straps (3) in contact with a user's shoulders.
6. Knapsack (1) according to Claim 5,

characterised in that said means (10) for supporting and cushioning (3) are composed, for every supporting shoulder strap (3), of at least one tubular band (12) adapted to be filled with a fluid.

7. Knapsack (1) according to Claim 6, characterised in that said at least one tubular band (12) for every shoulder strap (3) is equipped with at least two mutually-communicating fluid chambers (14, 16).
8. Knapsack (1) according to Claim 6, characterised in that said at least one tubular band (12) for every shoulder strap (3) is equipped with at least two mutually-separated fluid chambers (14, 16).
9. Knapsack (1) according to Claim 7 or 8, characterised in that said fluid chambers (14, 16) are of an elongated shape and are mutually parallel.
10. Knapsack (1) according to Claim 7 or 8, characterised in that said fluid chambers (14, 16) are of a quadrangular shape and are mutually adjacent on their respective sides.
11. Knapsack (1) according to any one of Claims 5 to 10, characterised in that said means (10)

extend for the whole length of the shoulder strap (3) to which they are connected.

12. Knapsack (1) according to any one of Claims 5 to 10, characterised in that said means (10) extend for part of a length of the shoulder strap (3) to which they are connected.

13. Knapsack (1) according to Claim 1, characterised in that said means (10) for supporting and cushioning are placed on a backboard (8) of the knapsack (1) on a side of the backboard (8) in contact with a user's back.

14. Knapsack (1) according to Claim 13, characterised in that said means (10) for supporting and cushioning are composed of at least two side elements (19, 19') that extend in a longitudinal direction with respect to a user's back.

15. Knapsack (1) according to Claim 14, characterised in that said side elements (19, 19') are realised in a single body.

16. Knapsack (1) according to Claim 14, characterised in that said side elements (19, 19') are realised with mutually-adjacent quadrangular chambers (20).

17. Knapsack (1) according to Claim 16,

characterised in that said mutually-adjacent quadrangular chambers (20) are mutually separated.

18. Knapsack (1) according to Claim 16, characterised in that said mutually-adjacent quadrangular chambers (20) are mutually communicating.

19. Knapsack (1) according to any one of Claims 13 to 18, characterised in that it is further equipped with additional means (10) for supporting and cushioning composed of at least one central element (21) that extends in a transverse direction with respect to the user's back.

20. Knapsack (1) according to Claim 19, characterised in that said central element (21) is realised in a single body.

21. Knapsack (1) according to Claim 19, characterised in that said central element (21) is realised with mutually-adjacent quadrangular chambers (22).

22. Knapsack (1) according to Claim 21, characterised in that said mutually-adjacent quadrangular chambers (22) are mutually separated.

23. Knapsack (1) according to Claim 21, characterised in that said mutually-adjacent quadrangular chambers (22) are mutually communicating.

24. Knapsack (1) according to Claim 1, characterised in that said means (10) for supporting and cushioning are placed on an handle (25) for transporting the knapsack (1) on a side of the handle (25) that is in contact with a user's hand palm.

25. Knapsack (1) according to Claim 1, characterised in that said means (10) for supporting and cushioning are placed on the supporting shoulder straps (3) and on the backboard (8) of the knapsack (1).

26. Knapsack (1) according to Claim 1, characterised in that said means (10) for supporting and cushioning are placed on the supporting shoulder straps (3) and on the transport handle (25) of the knapsack (1).

27. Knapsack (1) according to Claim 1, characterised in that said means (10) for supporting and cushioning are placed on the backboard (8) and on the transport handle (25) of the knapsack (1).



28. Knapsack (1) according to Claim 1, characterised in that said means (10) for supporting and cushioning are placed on the supporting shoulder straps (3), on the backboard (8) and on the transport handle (25) of the knapsack (1).

29. Knapsack (1) according to Claim 1, characterised in that each one of the means (10) for supporting and cushioning is equipped with inflating means adapted to perform an adjustable inflation of the means (10) for supporting and cushioning.

30. Knapsack (1) according to Claim 29, characterised in that said inflating means are composed of a small pump.

31. Knapsack (1) according to Claim 29, characterised in that said inflating means are composed of a pumping push-button.

32. Knapsack (1) according to Claim 1, characterised in that said knapsack (1) is adapted for school use, for transporting various kinds of school materials.

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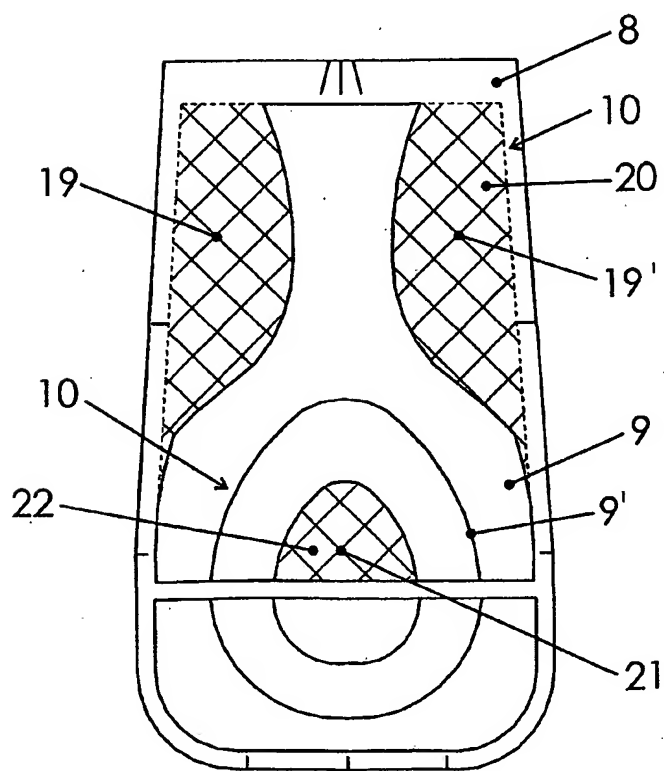
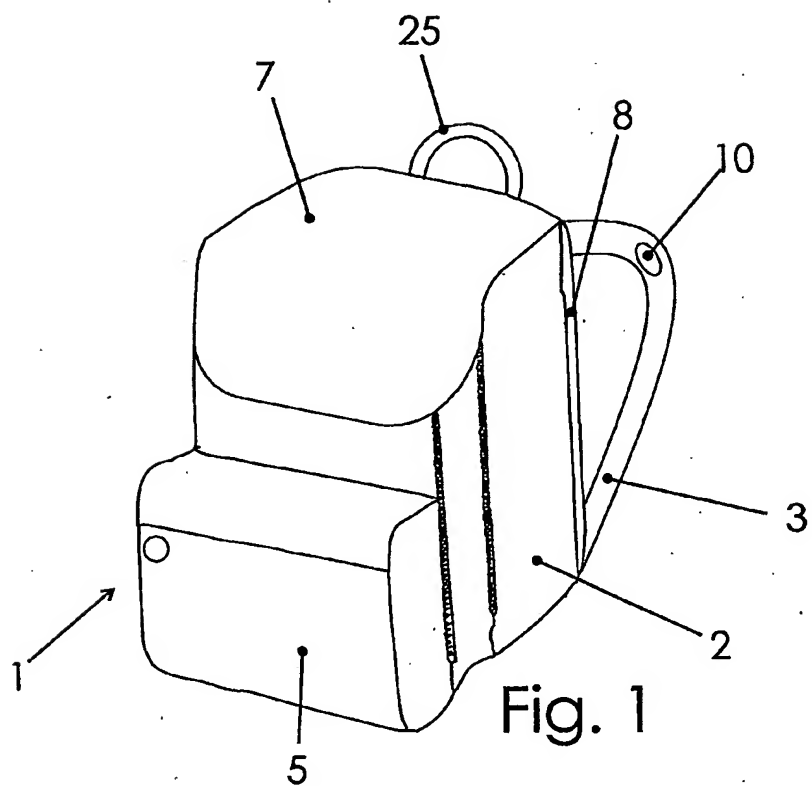


Fig. 4

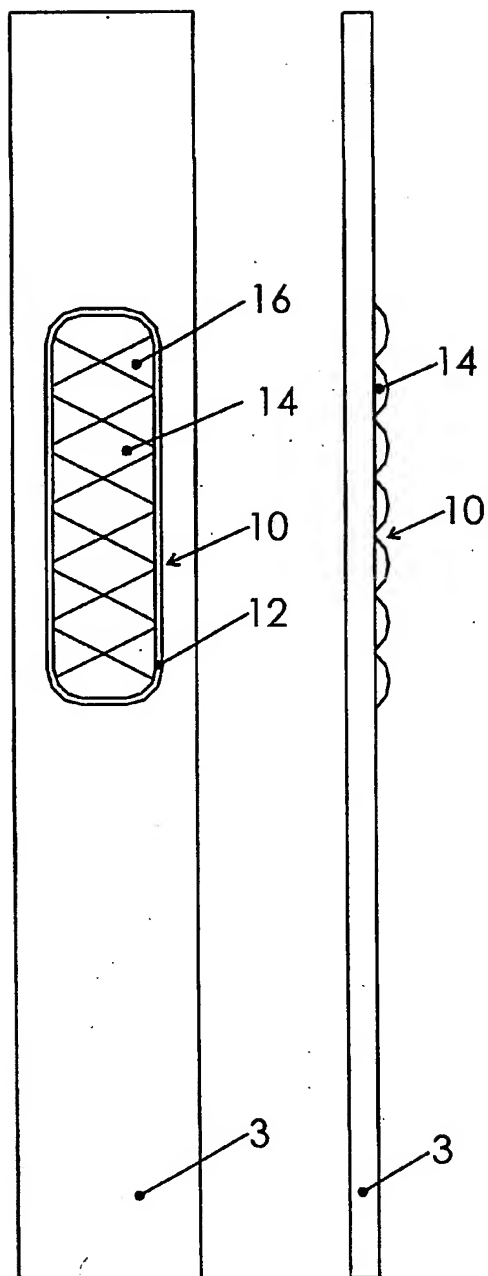


Fig. 2

Fig. 3

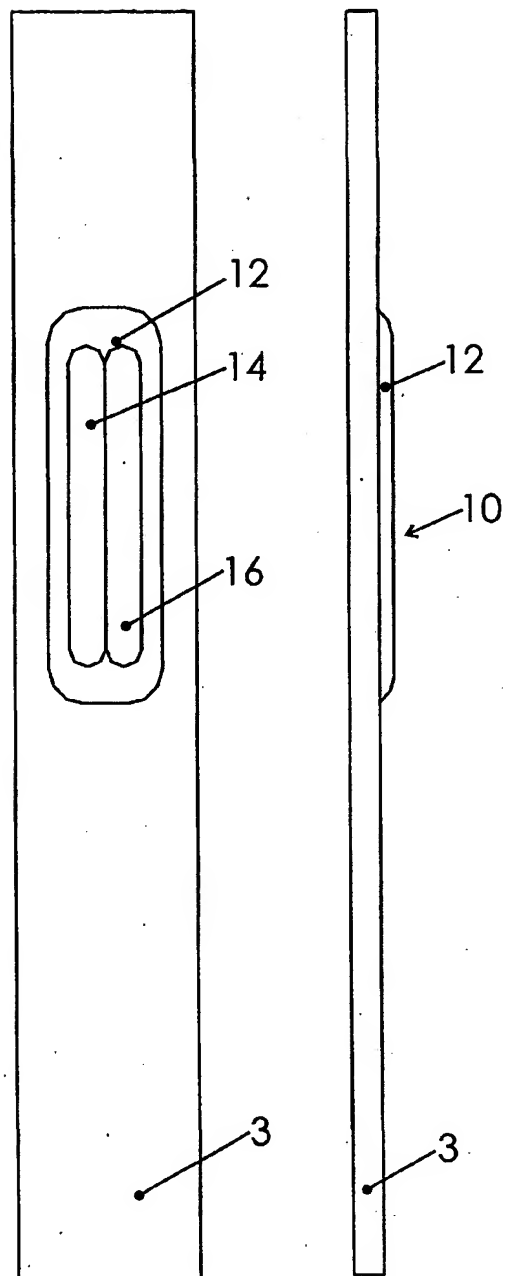


Fig. 7

Fig. 8

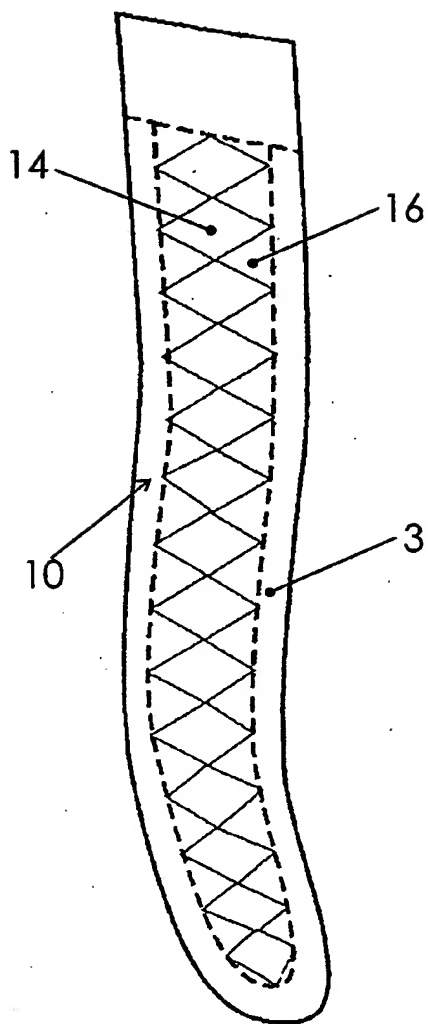


Fig. 5

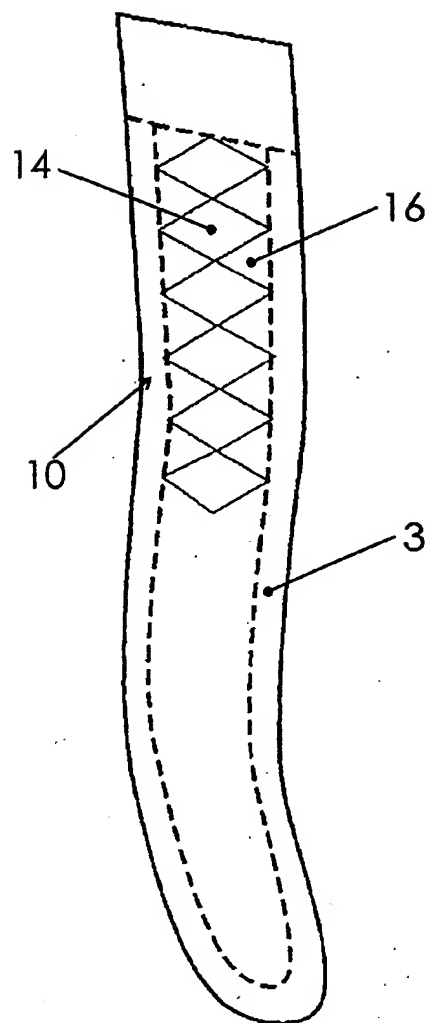


Fig. 6

## INTERNATIONAL SEARCH REPORT

Inten      Application No  
PCT/IT 00/00509

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7    A45C13/30    A45F3/12    A45F3/04

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7    A45C    A45F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 94 28756 A (BYEON SOOK JA) 22 December 1994 (1994-12-22)  page 3, line 1-14 page 7, line 35 -page 8, line 29 page 10, line 25 -page 11, line 11; figures 1-11	1-3, 5, 6, 12, 13, 24-30
Y	---	18-23
X	EP 0 898 906 A (MIZEN JOHN PAUL) 3 March 1999 (1999-03-03)  column 1, line 14-20 column 1, line 51 -column 2, line 17; figures 1-4	1-3, 5-10, 12, 31, 32
Y	---	18-23
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

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Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Lang, D

## INTERNATIONAL SEARCH REPORT

Inten Application No  
PCT/IT 00/00509

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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